

APPLICANT(S): Eyal, Zehavi
SERIAL NO.: Not Yet Determined
FILED: Not Yet Determined
Page 2

AMENDMENTS TO THE SPECIFICATION

In the Cross Reference to Related Applications:

Please add a Cross-Reference to Related Applications clause immediately following the Title of this application with the following Cross-Reference to Related Applications:

This Application is the National Stage of International Application No. PCT/IL 03/00918 filed November 6, 2003, which claims the benefit of US Provisional Application No. 60/424,725 filed November 8, 2002. Additionally, this application claims the benefit of Israeli Patent Application No. IL164086, filed September 14, 2004.

In the Specification:

Please replace the paragraph beginning on page 1, line 18 with the following rewritten paragraph:

In spite of their many advantages, dog-based security systems also have their shortcomings. For a dog-based security system to be effective, security personnel need to be in reach of the dogs for constant check-up and within hearing distance. For this end some systems make use of close-circuit surveillance systems providing full visual and audio coverage of the secured areas, which makes them costly and complex systems.

Please replace the paragraph beginning on page 4, line 19 with the following rewritten paragraph:

Figure 1 is a schematic illustration of the system's flow of information[.];

APPLICANT(S): Eyal, Zehavi
SERIAL NO.: Not Yet Determined
FILED: Not Yet Determined
Page 3

Please replace the paragraph beginning on page 4, line 20 with the following rewritten paragraph:

Figure 2 is a block diagram of the Monitoring unit[.];

Please replace the paragraph beginning on page 4, line 21 with the following rewritten paragraph:

Figure 3 is a block diagram of the processing and analyzing unit[.];

Please replace the paragraph beginning on page 4, line 22 with the following rewritten paragraph:

Figure 4 is a flow chart of the system's sound pattern processing and analyzing algorithm[.];

Please replace the paragraph beginning on page 4, line 24 with the following rewritten paragraph:

Figure 5 is a flow chart of the physiological data monitoring and analyzing process[.];

Please replace the paragraph beginning on page 4, line 26 with the following rewritten paragraph:

Figure 6 is a flow chart of the decision module algorithm[.]; and

Please replace the paragraph beginning on page 6, line 1 with the following rewritten paragraph:

APPLICANT(S): Eyal, Zehavi
SERIAL NO.: Not Yet Determined
FILED: Not Yet Determined
Page 4

Figure 2 illustrates the monitoring unit 100 that records and transmits vocal and physiological signals from the dogs. The audio signal-recording unit 110 is comprised of a sensor 111 for picking up the audio signal from the dogs. As illustrated in figure 1, the audio signal recording unit 110 may be attached or implanted to the dog or placed in its vicinity. The physiological sensor unit 120 records stress-related physiological indicators from the dogs' somatic system, such as heartbeat rate 121, blood pressure 122, breathing pace 123, body temperature 124 and gross motor activity 125. The physiological sensor unit 120 may be implanted into the dog or attached to its body. The monitoring unit 100 is also comprised of a AC\DC power supply unit 130, a power saving unit 140 (an electrical consumption reduction and saving unit), and a communication interface 150 which transmits the signals from the monitoring unit 100 to the processing and analyzing unit 200, using a radio transmitter or other physical communication methods. (Units 200 and 100 may be joined together to form one physical unit).

Please replace the paragraph beginning on page 7, line 7 with the following rewritten paragraph:

The audio processing and analyzing algorithm 231 receives the auditory signals and analyses them, hence providing a calculated estimation of the dog's psychological condition (indicating the dogs' alertness level). As illustrated in the flow charts in figure 4, the sound pattern processing algorithm module 231a processes the received signals, filters the environmental noise, and measures the energy level of several spectral bands of the audio signal and its cepstrum. The algorithm module 231b analyzes the processed signals and identifies emotional parameters. The

APPLICANT(S): Eyal, Zehavi
SERIAL NO.: Not Yet Determined
FILED: Not Yet Determined
Page 5

analysis is based on predetermined audio parameters, incorporates bark detection, as well as on, an estimation of the bark's fundamental frequency (pitch) and temporal parameters including mean bark rate, time gap between barks, time variant of barks, and their intensity.

Please replace the paragraph beginning on page 7, line 18 with the following rewritten paragraph:

The physiological analyzing algorithm 232 processes (see Fig. 5) the received physiological signals from the sensor 120 and estimates the dogs' emotional state based on the physiological data, according to predetermined physiological parameters (see Fig. 5). In the preferred embodiment, the physiological data includes the dogs' heartbeat rate 121, blood pressure 122,[[,]] breathing pace 123, body temperature 124, and gross motor activity 125[[]], but it may also include other physiological data such as[[]], muscles tonus, skin conductivity and so on. Algorithm 232 analyzes these parameters for every sensor individually.

Please replace the paragraph beginning on page 8, line 3 with the following rewritten paragraph:

The security decision algorithm module 233 processes (see figure 6) the complete analyzed output data from algorithms 231 and 232 to determine the state of the dog. According to these readings, module 233 determines the current level of security and the nature of any security events. As previously mentioned, the processing and analyzing unit 200 also includes a communication interface 240

APPLICANT(S): Eyal, Zehavi
SERIAL NO.: Not Yet Determined
FILED: Not Yet Determined
Page 6

which is a communication unit component. This unit notifies the user security terminal 300 as to the:

- ~~[[O]]~~occurrence of a security event,
- ~~[[D]]~~the dogs' state (asleep, dead, functional, level of alertness, etc.)
- ~~[[S]]~~system's functionality

Please replace the paragraph beginning on page 8, line 13 with the following rewritten paragraph:

~~Figure 4-b~~Block in Figure 4 231a specifies the flowchart of pre-processing of audio data. The processing of the audio signal includes the following steps: first, the digital signal is passed through an array of digital band-pass filters (BPF) with varying frequency ranges and widths. This eliminates noise and measures the amount of signal energy at each frequency band. In order to maintain a standard and consistent framework along the time signal, the signal is then normalized to a given range (-1,1), in an adaptive manner.

Please replace the paragraph beginning on page 9, line 3 with the following rewritten paragraph:

~~Figure 4-b~~Block 231[[]]b in Figure 4 specifies the flowchart of analyzing the audio digital data. First a sound pattern is detected. The sound pattern detected relates mainly to bark sounds, but may also relate to other behavior characteristics such as breathing, sniffing or panting. The following description relates specifically to barking sounds, although the same analysis may be applied to other behavior patterns. The purpose of this analysis is to recognize barks when they occur and

APPLICANT(S): Eyal, Zehavi
SERIAL NO.: Not Yet Determined
FILED: Not Yet Determined
Page 7

locate them on a time line. Looking for a specific ~~amplitude~~-energy pattern, which is typical to a dog's bark, achieves this purpose. The detected bark must also have a duration, which falls within predefined time limits, and have its amplitude above a certain level in order to be qualified as a bark. This step also helps the system to be more robust to various impulse and stationary noises. For each detected bark, the time-stamp of the bark peak, the bark's begin and end points, and the peak value are recorded into a vector. Each bark segment is further normalized by its peak energy value; so all barks are comparable in under equal conditions.

Please add the following paragraph immediately following the paragraph ending at page 10, line 2:

Next, spectral and cepstral analysis are performed for each qualified bark, and each bark is classified as one of three possible alert levels. The classification is performed by comparing the bark's spectral and cepstral features to a set of statistical models.

Please replace the paragraph beginning on page 10, line 13 with the following rewritten paragraph:

Th~~is~~is statistical data, combined with the pitch, spectral, cepstral and stress features are delivered to the final decision module 233. The statistical decision module 233 receives features and parameters that characterize emotional and physiological behavior of the current time frame. The decision may result in determining that there is no alert, that the alert is at a medium level or that there is a high alert. Alert at a medium level might mean that there is some suspicious activity

APPLICANT(S): Eyal, Zehavi
SERIAL NO.: Not Yet Determined
FILED: Not Yet Determined
Page 8

that needs attention, and high alert means that there is a definite territory intrusion, which may be an indication of a security breach.

Please replace the paragraph beginning on page 10, line 21 with the following rewritten paragraph:

At the same time the system can analyze every dog's physiological indicators, as received from the physiological sensor unit 120 as illustrated in figure 5. The physiological parameters are analyzed to determine the emotional state of the dog. The dog's state of alertness may be estimated by measuring different parameters of its somatic system. Being in a stressful situation causes an increase in the heartbeat rate, in the systolic blood pressure, in the body temperature and in the breathing rhythm and breathing depth. Monitored physiological parameters are categorized into three groups. Low rates on all indicators show that the dog is calm and that there is nothing attracting its attention in particular. A moderate increase in these parameters indicates that the dog is in a state of alertness due to an activity in its surroundings, which does not demand a special attention. High rates on these indicators show that the dog is in a state of stress and that an alarming situation has developed. In addition, measuring the dog's gross motor activity, taking into account its circadian activity rhythm and its general behavior patterns, can also help identifying irregular forms of reactions.

Please replace the paragraph beginning on page 11, line 15 with the following rewritten paragraph:

APPLICANT(S): Eyal, Zehavi
SERIAL NO.: Not Yet Determined
FILED: Not Yet Determined
Page 9

Monitoring the physiological status of the dog also ensures having a constant update on the well-being of the dog and his performance relating to security matters. Any attempt to hurt a dog, whether successful or unsuccessful, will be immediately apparent and would activate the alarms.